

AMENDMENTS TO THE CLAIMS

Applicants submit below a complete listing of the current claims, including marked-up claims with insertions indicated by underlining and deletions indicated by strikeouts and/or double bracketing. This listing of claims replaces all prior versions, and listings, of claims in the application:

Listing of the Claims

1-26 (Canceled)

27. (Currently amended) A receiver for receiving a signal comprising a modulated carrier, with a frame having a first and second training sequences, comprising:

a frequency offset estimation unit for receiving the signal and obtaining initial information relating to a carrier frequency offset from an autocorrelation signal obtained by autocorrelation of the first training sequence of the received signal and for obtaining an estimate of ~~[[a]]~~ the carrier frequency offset from the initial information and an autocorrelation signal obtained by autocorrelation of the second training sequence of the received signal;

a frequency offset compensation unit for compensating the received signal with the frequency offset obtained from the frequency offset estimation unit to form a compensated received signal, and

a time reference determining unit for obtaining a timing reference for the received signal by cross-correlation of the compensated received signal with a known training sequence.

28. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the time reference determining unit is adapted to obtain a first timing reference for the received signal by autocorrelation of the received signal and a second timing reference for the received signal by the cross-correlation of the compensated received signal with the known training sequence.

29. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the frequency offset estimation unit comprises means for determining a phase shift in the autocorrelation signal of the received signal.

30. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the receiver comprises means to detect a characteristic curve indicative of ~~[[a]]~~ the known training sequence in ~~[[the]]~~ a phase of the autocorrelation signal.

31. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the receiver comprises means to detect a characteristic curve indicative of ~~[[a]]~~ the known training sequence in ~~[[the]]~~ an amplitude of the autocorrelation signal.

32. (Currently amended) The receiver according to claim ~~[[4]]~~ 30, wherein the characteristic curve includes peaks and/or troughs and threshold values are used to detect the peaks and troughs.

33. (Currently amended) The receiver according to claim ~~[[6]]~~ 32, wherein the threshold values are set dynamically.

34. (Currently amended) The receiver according to claim ~~[[5]]~~ 31, wherein the characteristic curve includes peaks and/or troughs and threshold values are used to detect the peaks and troughs.

35. (Currently amended) The receiver according to claim ~~[[8]]~~ 34, wherein the threshold values are set dynamically.

36. (Currently amended) The receiver according to claim ~~[[3]]~~ 29, wherein the frequency offset estimation unit comprises means for determining the carrier frequency offset from the phase shift.

37. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the

receiver comprises means to determine a sign of the carrier frequency offset CFO from ~~[[the]]~~ a phase of the autocorrelation signal from a known sequence.

38. (Currently amended) The receiver according to claim ~~[[11]]~~ 37, wherein the receiver has means for determining a phase shift in the autocorrelation signal from a further known sequence of the received signal.

39. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the time reference determining unit comprises means to determine a characteristic curve indicative of a known training sequence in ~~[[the]]~~ an amplitude of the autocorrelation signal.

40. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the time reference determining unit comprises means to determine a characteristic curve indicative of a known training sequence in ~~[[the]]~~ a phase of the autocorrelation signal.

41. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the time reference determining unit comprises means to determine a characteristic curve indicative of a known training sequence in ~~[[the]]~~ an amplitude of the cross-correlation of the compensated received sequence with the known training sequence.

42. (Currently amended) The receiver according to claim ~~[[15]]~~ 41, wherein the characteristic curve includes peaks and/or troughs and threshold values are used to detect the peaks and troughs.

43. (Currently amended) The receiver according to claim ~~[[16]]~~ 42, wherein the threshold values are set dynamically.

44. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the receiver is adapted to output the timing reference obtained from the received signal by autocorrelation of the received signal if the timing reference obtained by cross-correlation of the compensated received signal with the known training sequence is not present.

45. (Currently amended) The receiver according to claim ~~[[18]]~~ 44, wherein the receiver is adapted to otherwise output the timing reference determined by cross-correlation of the received signal.

46. (Currently amended) The receiver according to claim ~~[[18]]~~ 44, wherein the receiver is adapted to compare the timing reference for the received signal obtained by cross-correlation of the compensated received signal with the known training sequence when present and the timing reference determined by autocorrelation of the received signal, and to output a reset signal if the two timing references differ by more than a threshold value and otherwise to output the timing reference for the received signal obtained by cross-correlation of the compensated received signal with the known training sequence.

47. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the timing reference determining unit is adapted to determine a symbol timing from a correlation peak in the cross-correlation of the received signal with the training sequence.

48. (Currently amended) The receiver according to claim ~~[[1]]~~ 27, wherein the received signals also contain a cyclic prefix, the receiver further comprising: means for obtaining an accurate value for the carrier frequency offset by autocorrelation of the cyclic prefix with the received signal.

49. (Currently amended) An OFDM telecommunications system including ~~[[a]]~~ the receiver according to claim ~~[[1]]~~ 27.

50. (Currently amended) A method for processing a received signal comprising a modulated carrier having a frame with a first and second training sequences, comprising:

obtaining initial information relating to a carrier frequency offset from an autocorrelation signal obtained by autocorrelation of the first training sequence of the received signal;

obtaining an estimate of ~~[[a]]~~ the carrier frequency offset from the initial information and an autocorrelation signal obtained by autocorrelation of the second training sequence of the

received signal;

compensating the received signal with the obtained estimate of the frequency offset to form a compensated received signal, and

obtaining a timing reference for the received signal by cross-correlation of the compensated received signal with a known training sequence.

51. (New) The receiver according to claim 27, wherein the initial information relating to the carrier frequency offset comprises a sign of the carrier frequency offset.

52. (New) The method of claim 50, wherein the step of obtaining initial information relating to the carrier frequency offset comprises determining a sign of the carrier frequency offset.